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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/714,773	11/17/2003	Hiroshi Yoshino	ELPIDA 03USFP934	2414
27667	7590	12/13/2006	EXAMINER	
HAYES, SOLOWAY P.C. 3450 E. SUNRISE DRIVE, SUITE 140 TUCSON, AZ 85718			RAYMOND, BRITTANY L	
			ART UNIT	PAPER NUMBER
			1756	

DATE MAILED: 12/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/714,773	<b>Applicant(s)</b> YOSHINO, HIROSHI	
	<b>Examiner</b> Brittany Raymond	<b>Art Unit</b> 1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 9-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 21-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |  |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>11/17/2003</u> . | 6) <input type="checkbox"/> Other: ____  |

**DETAILED ACTION**

***Election/Restrictions***

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-8 and 21-24, drawn to a method, classified in class 430, subclass 322.
  - II. Claims 9-16, drawn to a computer program product, classified in class 165, subclass 205.
  - III. Claims 17-20, drawn to a heat treatment apparatus, classified in class 432, subclass 120.

The inventions are distinct, each from the other because of the following reasons:

Inventions II and I are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product. See MPEP § 806.05(h). In the instant case the process for using the product as claimed can be practiced with another materially different product, such as manually.

Inventions I and III are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another and materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP §

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806.05(e)). In this case the apparatus as claimed can be used to practice another and materially different process, such as a single temperature heat treatment.

Inventions II and III are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different designs, modes of operation, and effects (MPEP § 802.01 and § 806.06). In the instant case, the apparatus claims do not require the use of a computer program.

Because these inventions are independent or distinct for the reasons given above and there would be a serious burden on the examiner if restriction is not required because the inventions have acquired a separate status in the art due to their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

2. During a telephone conversation with Mr. Norman Soloway on 11/09/2006 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-8 and 21-24. Affirmation of this election must be made by applicant in replying to this Office action. Claims 9-20 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 4 and 21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. As to claim 4, it is unclear what (b1) is referring to

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since claim 3 recites (b11). Claim 2 recites (b1). As to claim 21, it is unclear if there are steps prior to the "forming a resist pattern..." step since the step recitations start with the letter (c) instead of (a).

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

6. Claims 1 and 21 are rejected under 35 U.S.C. 102(a) as being anticipated by Lin (U.S. Patent 6348301).

Lin discloses a method for reducing a critical dimension of a patterned photoresist layer comprising: forming a film layer over a substrate, coating the film layer with a photoresist layer, soft-baking the photoresist, exposing the photoresist, post-exposure baking the photoresist, developing the photoresist, and hard-baking the photoresist (Column 3, Lines 46-55). The post-exposure baking step has a first baking step, which uses a temperature that is higher than the melting point of the photoresist layer, and a second baking step, which uses a temperature that is selected such that the width of the opening is reduced linearly as the heating time increases (Column 3, line 66 to Column 4, Line 5), or so that a desired variation of dimensions is reached, as recited in claim 1 of the present invention. Once the photoresist is patterned, it is used as a mask to etch the film layer (Column 4, Lines 7-8). The steps described above are

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recited in claim 21 of the present invention. The step of removing the resist pattern, as recited in claim 21, is depicted in Figures 4B and 4C.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 2-8 and 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (U.S. Patent 6348301) in view of Whiting (U.S. Patent 6235439).

The teachings of Lin have been discussed in Paragraph 6 above. In addition to the teachings above, Lin states that data of critical dimension versus time and critical dimension versus temperature is used to help determine the second baking temperature, as well as the amount of time each baking takes, as recited in claims 3, 4, 7, 8, 23, and 24 of the present invention.

Lin fails to describe, specifically, how the second temperature is determined. Lin also fails to state that the substrate is heated in a plurality of areas.

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Whiting discloses a method for controlling the image size of integrated circuits comprising: infrared cameras or a pyroelectric or pyrothermal component to detect the temperature of the wafer at particular locations (Column 4, Lines 19-21), a nominal temperature setpoint, providing a matrix of image size measurements, by zone, from prior wafers, providing a matrix of temperature adjustments used on the wafers measured to produce the image size measurements from before, providing a matrix of image size targets used on the wafers, dividing the change in image size by the change in temperature to find a slope, calculating a matrix of image size deviations from the target, using the slope and image size deviations to calculate a matrix of targeted temperatures per zone, and setting the targeted temperatures at each zone using a controller (Column 5, Lines 8-49), as recited in claims 2-8 and 22-24 of the present invention.

It would have been obvious to one of ordinary skill in this art, at the time of invention by applicant, to have modified the determination of the second baking temperature by using temperature dependence data and time of each baking of Lin by using the data and types of calculations, as suggested by Whiting because Whiting teaches that in order to produce a photoresist with desired dimensions, calculations are needed to determine temperatures to create those dimensions. It also would have been obvious to have heated the substrate in several areas, as suggested by Whiting because Whiting teaches that it allows for a more uniform surface temperature of the substrate, which leads to more uniform pattern dimensions.

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**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brittany Raymond whose telephone number is 571-272-6545. The examiner can normally be reached on Monday through Friday, 8:00 a.m. - 4:30 p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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